June 1993

Mathematics 30

Grade 12 Diploma Examination

Alberta
EDUCATION

June 1993

Mathematics 30

Grade 12 Diploma Examination

Description

Time allotted: 2.5 h (you may take an additional 0.5 h to complete the exam if needed)
Total possible marks: 70

This is a **closed-book** examination consisting of **three** parts:

Part A
has 42 multiple-choice questions each with a value of one mark.

Part B
has 7 numerical-response questions each with a value of one mark.

Part C
has 4 written-response questions for a total of 21 marks.

A tear-out formula sheet, *z*-score page, and 90% Box Plots are included in this booklet.

Instructions

- Fill in the information required on the answer sheet and the examination booklet as directed by the presiding examiner.
- You are expected to provide your own scientific calculator.
- Carefully read the instructions for each part before proceeding.
- The presiding examiner will collect your answer sheet and examination booklet and send them to Alberta Education
- Do not fold the answer sheet.

Note: *The perforated pages at the back of this booklet may be torn out and used for your rough work.* ***No marks*** *will be given for work done on the tear-out pages.*

Part A: Multiple Choice

42 Questions

Instructions

- Consider all numbers used in the questions to be **exact real** numbers and not the result of a measurement.
- Read each question carefully and decide which of the choices **best** completes the statement or answers the question.
- Locate that question number on the separate answer sheet provided and fill in the circle that corresponds to your choice.

Example

This diploma examination is for the subject of

A. biology
B. physics
C. chemistry
D. mathematics

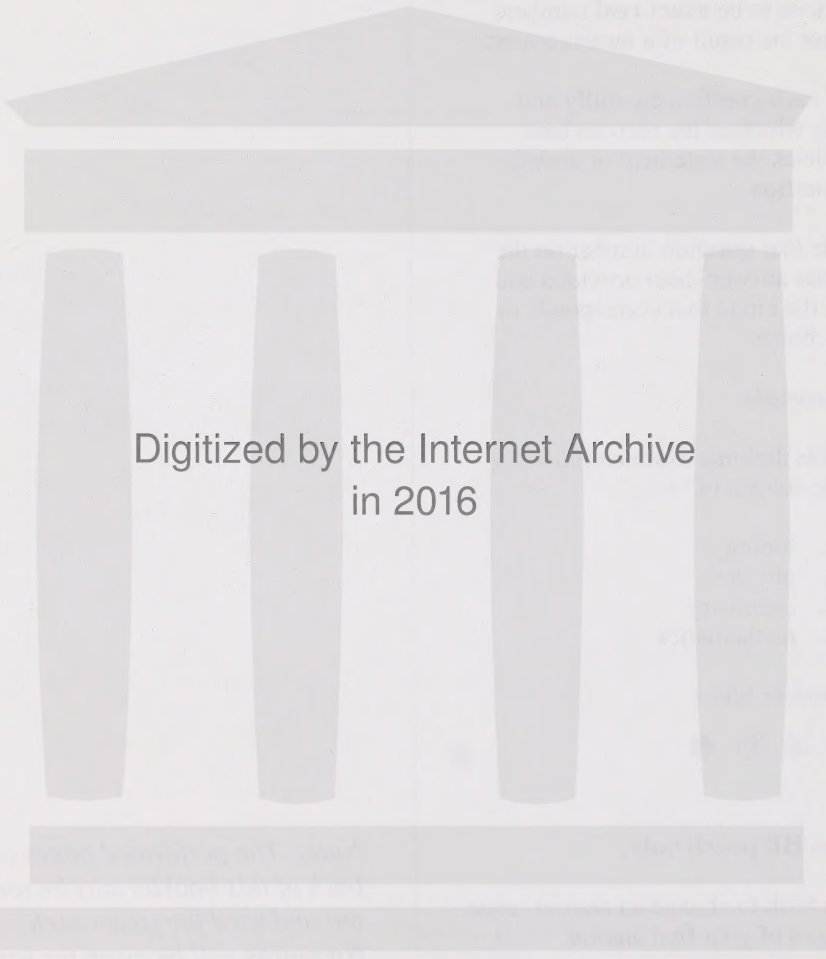
Answer Sheet

Ⓐ Ⓑ Ⓒ ●

- **Use an HB pencil only.**
- If you wish to change an answer, erase **all** traces of your first answer.

Note: *The perforated pages at the back of this booklet may be torn out and used for your rough work.* ***No marks*** *will be given for work done on the tear-out pages.*

Do not turn the page to start the examination until told to do so by the presiding examiner.



1. Correct to the nearest degree, 2.6 rad is equal to

A. 16°

B. 149°

C. 298°

D. 468°

2. The radian measure of an angle θ is $\frac{4\pi}{3}$. If the arc that subtends the angle θ has a length of 8π, then the radius of the circle is

A. 6

B. $\frac{32}{3}$

C. 6π

D. $\frac{32\pi}{3}$

3. If $10\cos\theta + 6 = 0$, then the value of $\sec\theta$ is

A. $-\frac{5}{4}$

B. $-\frac{5}{3}$

C. $\frac{5}{4}$

D. $\frac{5}{3}$

4. The trigonometric expression $\sin^2\theta + \sin^2\theta\cot^2\theta$, $\sin\theta \neq 0$, is equal to

A. -1
B. 1
C. $\sec^2\theta$
D. $2\sin^2\theta\cot^2\theta$

5. Correct to the nearest degree, the solution to $3\cos\theta + 1 = 0$, $0° \leq \theta < 360°$, is

A. $79°$
B. $109°$
C. $79°$ and $289°$
D. $109°$ and $251°$

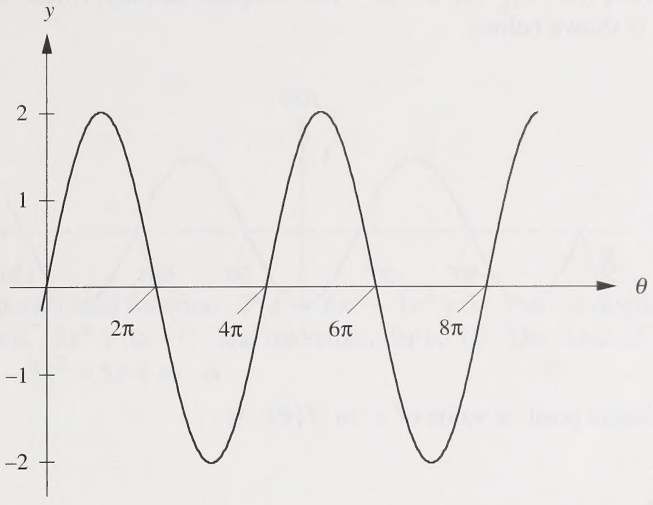
6. The expression $\sin 4x\cos x - \sin x\cos 4x$ is equivalent to

A. $\sin 5x$
B. $\cos 5x$
C. $\sin 3x$
D. $\cos 3x$

7. If $\sin(x+y) = 0.6241$ and $\sin(x-y) = 0.3201$, then the value of $\sin x\cos y$ is

A. 0.1520
B. 0.1998
C. 0.4442
D. 0.4721

8. The graph of $y = a \sin b\theta$ is shown below.



The value of b in $y = a \sin b\theta$ is

A. $\frac{1}{2}$

B. 2

C. 4π

D. 8π

9. If the function $f(\theta) = a\cos\left[b(\theta + c)\right] + d$ has a range of $2 \le f(\theta) \le 6$, then

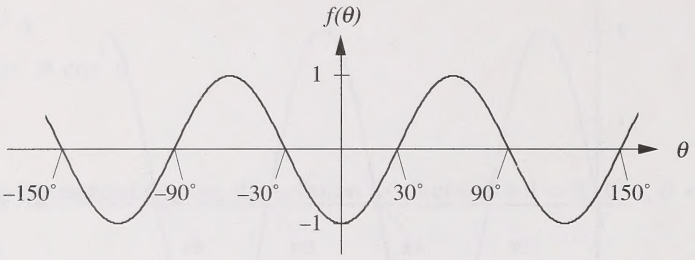
A. $a = 0$ and $d = 4$

B. $a = 0$ and $d = 6$

C. $a = 2$ and $d = 4$

D. $a = 2$ and $d = 6$

10. On a computer, your friend graphed a function in the form of $f(\theta) = a\sin[b(\theta + c)] + d$, $a > 0$. The computer display, where θ is measured in degrees, is shown below.



The minimum positive value of c in $f(\theta)$ is

A. $0°$

B. $60°$

C. $90°$

D. $120°$

11. If $3\tan\theta\cos\theta + 1 = \sin\theta$, $0 \le \theta < 2\pi$, then the values of θ are

A. $\frac{7\pi}{6}, \frac{11\pi}{6}$

B. $\frac{2\pi}{3}, \frac{\pi}{3}$

C. $\frac{4\pi}{3}, \frac{5\pi}{3}$

D. $\frac{\pi}{6}, \frac{5\pi}{6}$

12. Correct to the nearest tenth of a degree, an x-intercept of the graph of $f(x) = (\cos x - 5)(4\cos x - 3)$, $0 \le x < 360°$, is

A. $1.3°$

B. $5.0°$

C. $41.4°$

D. $78.5°$

13. When the polynomial function $P(x) = 3x^3 + 2x^2 - x - 1$ is divided by $x + 2$, the remainder is

A. -19

B. -15

C. 14

D. 17

14. When the polynomial function $P(x) = 6x^3 - 3x^2 + 5x + m$ is divided by $2x - 3$, the quotient is $3x^2 + 3x + 7$ and the remainder is 15. The value of m in $P(x) = 6x^3 - 3x^2 + 5x + m$ is

A. -21

B. -6

C. 15

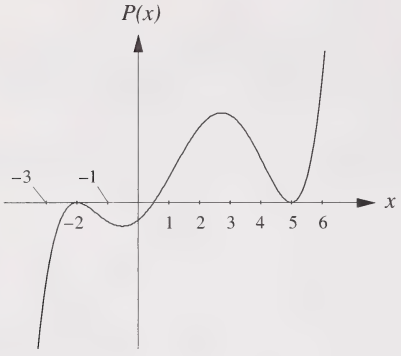
D. 22

15. A fifth-degree polynomial function satisfies the following conditions:

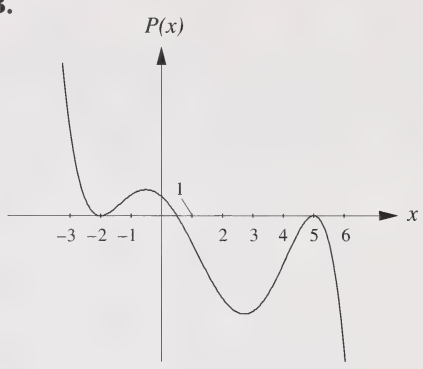
- $P(-1) < 0$
- $P(4) > 0$
- the only two integral zeros of $P(x)$ are -2 and 5

Which of the following **could** represent the graph of $P(x)$?

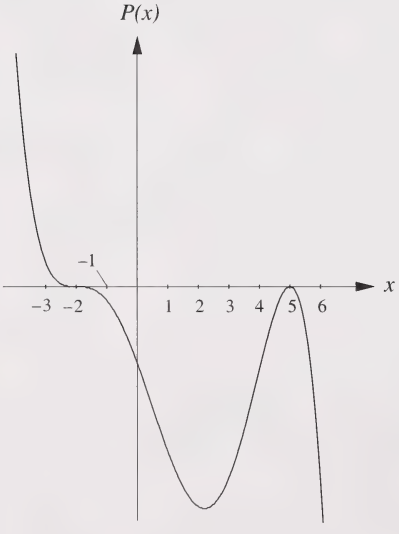
A.



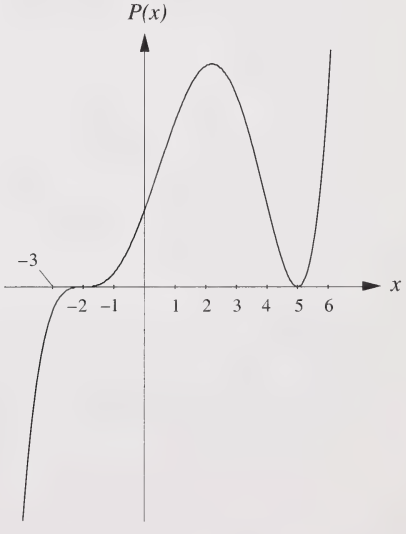
B.



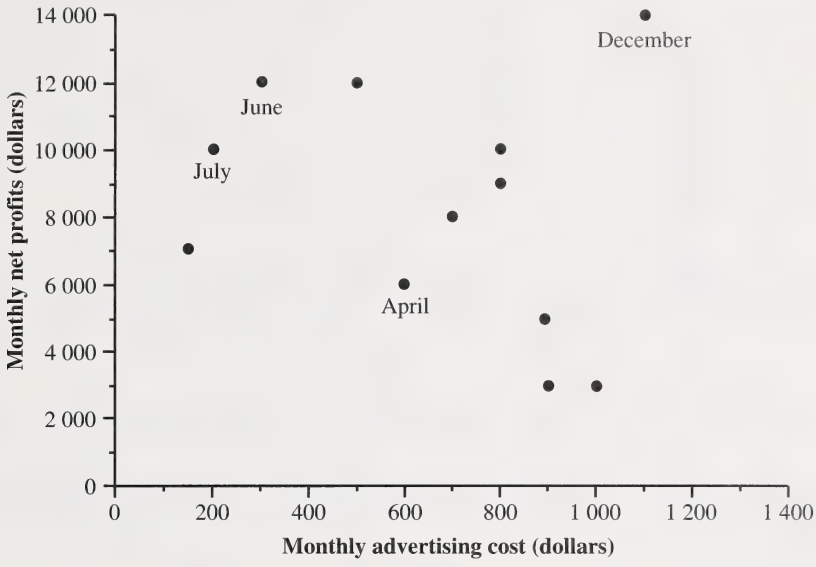
C.



D.



16. The following scatter plot shows a small department store's advertising costs and profits for a 12-month period.



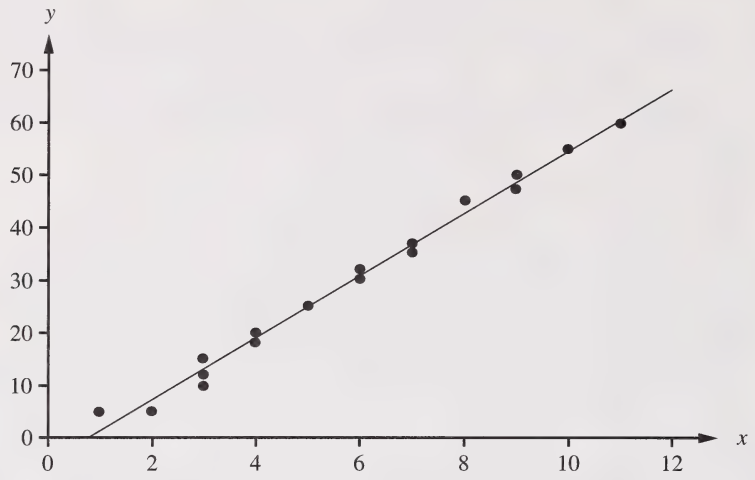
The greatest profit per advertising dollar came in the month of

A. April
B. June
C. July
D. December

17. For a set of data on a scatter plot, a student wants to draw a line of best fit using the median fit method. The student divides the scatter plot into three regions. **One** of these regions on the scatter plot contains only the following points: (3, 9), (5, 13), (5, 20), (6, 16), and (8, 17). The median point in this region is

A. (5, 16)
B. (5, 20)
C. (5.4, 13)
D. (5.4, 15)

18. Data and the corresponding line of best fit for $1 \leq x \leq 12$ are shown on the following scatter plot.



The equation of the line of best fit (or the prediction equation) for these data is most likely to be

A. $y = 0.9x - 5$

B. $y = 0.9x + 1$

C. $y = 6x - 5$

D. $y = 6x + 1$

19. The raw scores of a test are normally distributed with a mean of 170 and a standard deviation of 20. Correct to the nearest tenth, the approximate percentage of students who scored between 135 and 195 is

A. 85.4%

B. 46.0%

C. 14.6%

D. 6.6%

20. The results of a test are normally distributed with a mean of 61.5. If 35.2% of the test scores are greater than 67, then correct to the nearest tenth the standard deviation for this test is

A. 14.5

B. 13.6

C. 12.5

D. 11.2

21. An object moves along a path such that the difference of the distances between the moving object and two fixed points is constant. The path of this object can be described as that of

A. a circle

B. an ellipse

C. a parabola

D. a hyperbola

22. A quadratic relation is described by $Ax^2 + Cy^2 + Dx + Ey + F = 0$ where all the numerical coefficients are non-zero integers. The only shape that is **not** possible is

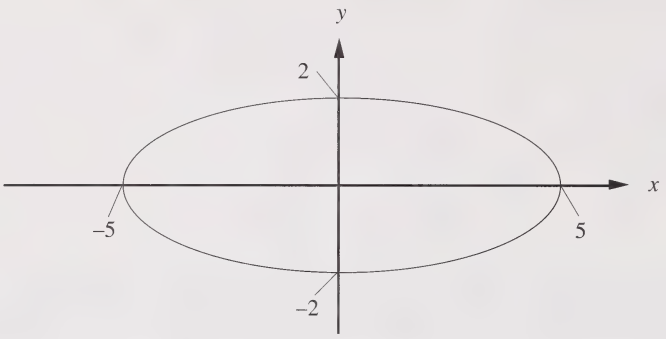
A. a circle

B. an ellipse

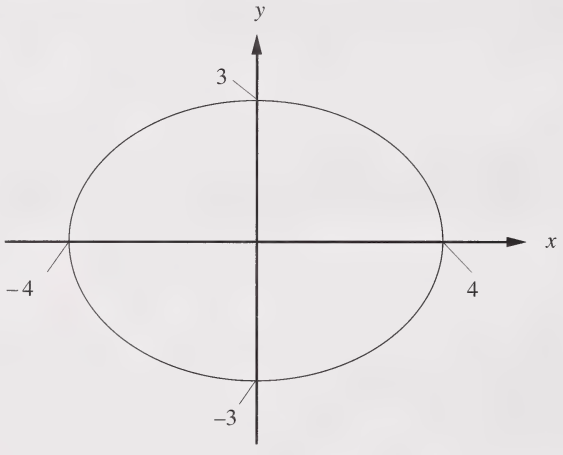
C. a parabola

D. a hyperbola

Use the following information to answer question 23.



Ellipse 1



Ellipse 2

23. If the eccentricity of ellipse 1 is e_1 and of ellipse 2 is e_2, then

A. $1 < e_1 < e_2$

B. $1 < e_2 < e_1$

C. $0 < e_1 < e_2 < 1$

D. $0 < e_2 < e_1 < 1$

24. If $5^{3x+8} = 25^{3-x}$, then the value of x is

A. $-\frac{3}{5}$

B. $-\frac{2}{5}$

C. $\frac{2}{5}$

D. $\frac{3}{5}$

25. An exponential form of $a = \log_c b$ is

A. $c = b^a$

B. $c = a^b$

C. $b = c^a$

D. $b = a^c$

27. The graph of the function $y = 2^x$ passes through the point $P(a, 60)$. Correct to the nearest tenth, the value of a is

A. 30.0

B. 5.9

C. 1.5

D. 0.9

26. The graphs of $f(x) = 9^x$ and $g(x) = \log_9(x)$ are symmetrical with respect to the

A. x-axis

B. y-axis

C. line $y = -x$

D. line $y = x$

28. If $\log_8 3 = x$ and $\log_4 7 = y$, then $\log_2 21$ in terms of x and y is

A. $x + y$

B. $2x + 3y$

C. $3x + 2y$

D. $3x + 7y$

29. If $\log_2(3x + 1) - \log_2(x - 3) = \log_2(8)$, then x is

A. $\frac{11}{2}$

B. 5

C. $\frac{23}{5}$

D. 3

30. The x-intercept of the graph of $y = \log_3(x + 2)$ is

A. -1

B. -2

C. $\log_3 2$

D. $\log_3 3$

31. A particular rare coin is said to triple in value every 20 years. If the initial value of the coin is \$25, then an equation that could describe the coin's increasing value (V dollars) with respect to time (t years) is

A. $V = 25(3)^{\frac{t}{20}}$

B. $V = 25(3)^{20t}$

C. $V = 3(25)^{\frac{t}{20}}$

D. $V = 3(25)^{20t}$

32. If the number of terms in the expansion of the binomial $(a + 2)^{n+6}$, $n + 6 \in \mathrm{W}$ is 17, then the value of n is

A. 10

B. 11

C. 17

D. any natural number

33. If one letter is chosen from all the letters in the word **SASKATOON**, then the probability that this one letter is an **S** or an **A** or an **O** is

A. $\frac{1}{3}$

B. $\frac{4}{9}$

C. $\frac{1}{2}$

D. $\frac{2}{3}$

34. The manager of a grocery store is hiring staff to fill 4 identical positions. There are 12 applicants for the positions. From these applicants, the manager selects Joe Hardoak because he has the most experience. The other applicants are all equally qualified, so the manager randomly selects 3 of them. The number of different ways the manager can fill these 4 positions is

A. 990

B. 495

C. 220

D. 165

35. Lara invites Kristos and 6 other guests to her birthday party. If Lara and Kristos sit next to one another, the number of ways in which Lara and her 7 guests can be seated at a circular table is

A. 720
B. 1 440
C. 5 040
D. 10 080

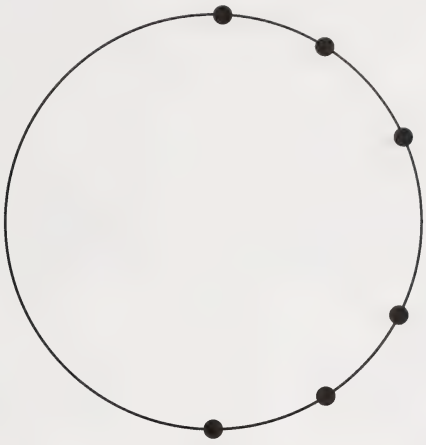
36. A high school basketball team consists of 5 guards and 6 forwards. The number of ways that the coach can select a starting lineup of 2 guards and 3 forwards is

A. 20
B. 30
C. 200
D. 462

37. A child is playing with 4 blocks: one red, one blue, one orange, and one green. In how many different ways can the child stack 2, 3, or 4 of these blocks?

A. 12
B. 16
C. 24
D. 60

38. Six distinct points are on the circumference of a circle as shown below.



The number of different quadrilaterals that can be formed using these 6 points is

A. 360
B. 30
C. 24
D. 15

39. In a geometric sequence, the sixth term is 160 and the ninth term is 1 280. The eleventh term in this sequence is

A. 10 240
B. 5 120
C. 2 560
D. 2 025

40. The number of terms in the arithmetic sequence $\sqrt{2}, 3\sqrt{2}, 5\sqrt{2}, \ldots, 75\sqrt{2}$ is

A. 36
B. 37
C. 38
D. 39

41. $1^2, 2^2, 3^2, \ldots, 10^2$ represents

A. an infinite sequence
B. a finite sequence
C. a finite series
D. an infinite series

42. Frederick starts a rumor by telling 3 of his friends some gossip (call this round 1). Each of these friends tells the rumor to 3 other people (round 2). Those 9 people each tell the rumor to 3 other people (round 3), and so on. Amazingly enough, no one ever hears the rumor more than once. The number of people, t_n, who are told the rumor in the nth round is

A. $t_n = 3 + t_{n-1}, \quad t_1 = 3; \quad n > 1$
B. $t_n = 1 + 3t_{n-1}, \quad t_1 = 3; \quad n > 1$
C. $t_n = 3n; \quad n \geq 1$
D. $t_n = 3^n; \quad n \geq 1$

You have now completed Part A. Proceed directly to Part B.

Part B: Numerical Response

7 Questions

Instructions

- Consider all numbers used in the questions to be **exact real** numbers and not the result of a measurement.
- Read each question carefully.
- Record your answer on the answer sheet provided by writing it in the boxes and then filling in the corresponding circles.
- **Enter the first digit of your answer in the left-hand box and leave any unused boxes blank.**
- Use an HB pencil only.
- If you wish to change an answer, erase **all** traces of your first answer.

Sample Questions and Solutions

If θ is acute and $\sin\theta = 0.6735$, then the measure of θ correct to the nearest tenth of a degree is _____.

$\theta = 42.33777464 \ldots °$

Record 42.3 on the answer sheet →

For the arithmetic series $-8 + (-5) + (-2) + \ldots + (85)$, the number of terms is _____.

$85 = -8 + (n - 1)(3)$

$93 = 3n - 3$

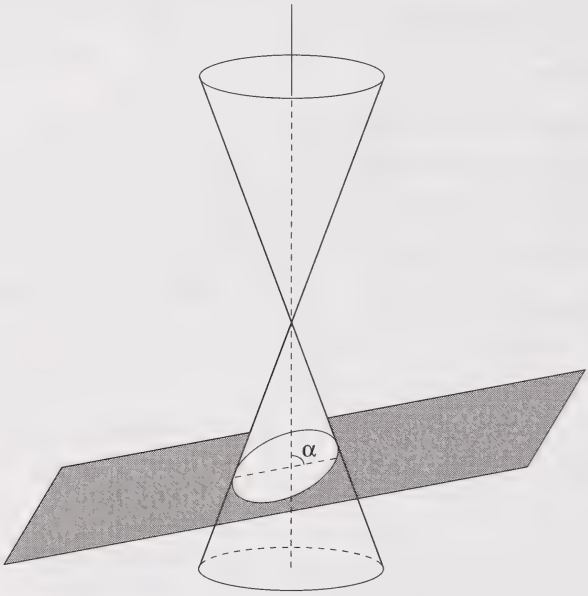
$n = 32$

Record 32 on the answer sheet →

Start Part B immediately.

1. If $x-2$ is a factor of the polynomial $P(x) = -2x^3 + nx^2 - 4x + 4$, then the value of n in $P(x)$ is _____ .

2. A plane cuts a circular conical surface as shown below.



The angle between the plane and the axis of the conical surface is α. The value of α required to produce a circle is _____ °.

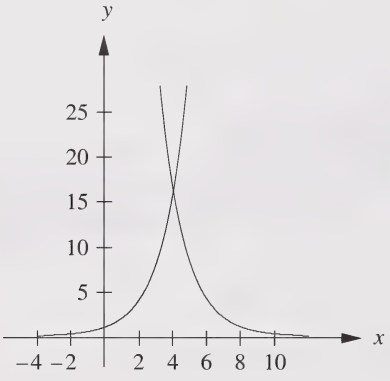
3. The results of an examination are found to be normally distributed with a standard deviation of 8.3. Michelle's score of 75 on this examination corresponds to a z-score of 1.35. The mean for this examination, correct to the nearest tenth, is _____ .

4. The value of $\sum_{k=1}^{47}(4k-1)$ is _____ .

5. There are 45 ways of choosing a committee of 2 students from a class. The number of students in the class is _____ .

6. If θ is acute and $\tan\left(\frac{\theta}{2}\right) = 0.6847$, then correct to the nearest tenth of a degree θ is _____ °.

7. Caitlin used her computer to graph $y = 2^x$ and $y = \left(\frac{1}{2}\right)^x$ on the same set of axes. She then moved the graph of $y = \left(\frac{1}{2}\right)^x$ to the right so that the two graphs intersect at the point (4, 16). The display on her computer screen after the move is shown below.



The number of units Caitlin moved the graph of $y = \left(\frac{1}{2}\right)^x$ to the right is _____ .

You have now completed Part B. Proceed directly to Part C.

Part C: Written Response

4 Questions

Instructions

- Consider all numbers used in the questions to be **exact real** numbers and not the result of a measurement.
- Read each question carefully.
- Write your answers in the examination booklet as neatly as possible.
- For full marks, your answers **must show all** pertinent explanations, calculations, and formulas.
- Your answers **should be** presented in a well-organized and appropriate manner.

Note: *The perforated pages at the back of this booklet may be torn out and used for your rough work.* ***No marks*** *will be given for work done on the tear-out pages.*

Start Part C immediately.

For Department Use Only

4 marks

1. In Joseph's final year of university, he received a $10 ticket for a parking violation on campus. If a ticket is not paid immediately, the university charges interest at the rate of 1% per day compounded daily. This means that each day, the university adds 1% of the unpaid amount to the total cost of the parking ticket.

Joseph forgot all about his parking violation until he learned that students with unpaid parking tickets cannot attend the graduation ceremony. He owed $100.60 when he paid the ticket.

How many days had passed before Joseph paid his parking ticket?

For Department Use Only

5 marks

2. You are working on an quadratic relations assignment. You have the following information about a quadratic relation:

- the graph of the relation passes through the points (5, 0) and (0, –3)
- the relation has a focus at $F(4, 0)$ and a corresponding directrix of $x = 6.25$

This quadratic relation is described by one of the following two equations:

Equation A: $3x^2 - 25y - 75 = 0$
Equation B: $9x^2 + 25y^2 - 225 = 0$

Determine whether Equation A or Equation B defines the quadratic relation and clearly explain how you reached your conclusion.

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Total: 7 marks

(3 marks)

3. A well-constructed survey of Alberta high school students shows that 75% believe the penalties for drinking and driving should be increased.

a. Assume that the same proportion of 75% was obtained with a sample of size 40 and a sample of size 100.

Determine the approximate 90% confidence intervals for the survey with these two samples.

For Department Use Only

(4 marks)

b. A similar survey, with the same sampling methods (survey design) and with the same questions, was repeated in a large Alberta high school. Only 65% of the students at that high school believe the penalties for drinking and driving should be increased.

From a **statistical perspective**, identify one factor that might have contributed to the results of the survey in this large Alberta high school being different from the results of the survey of Alberta high school students. Explain how this factor affects the results.

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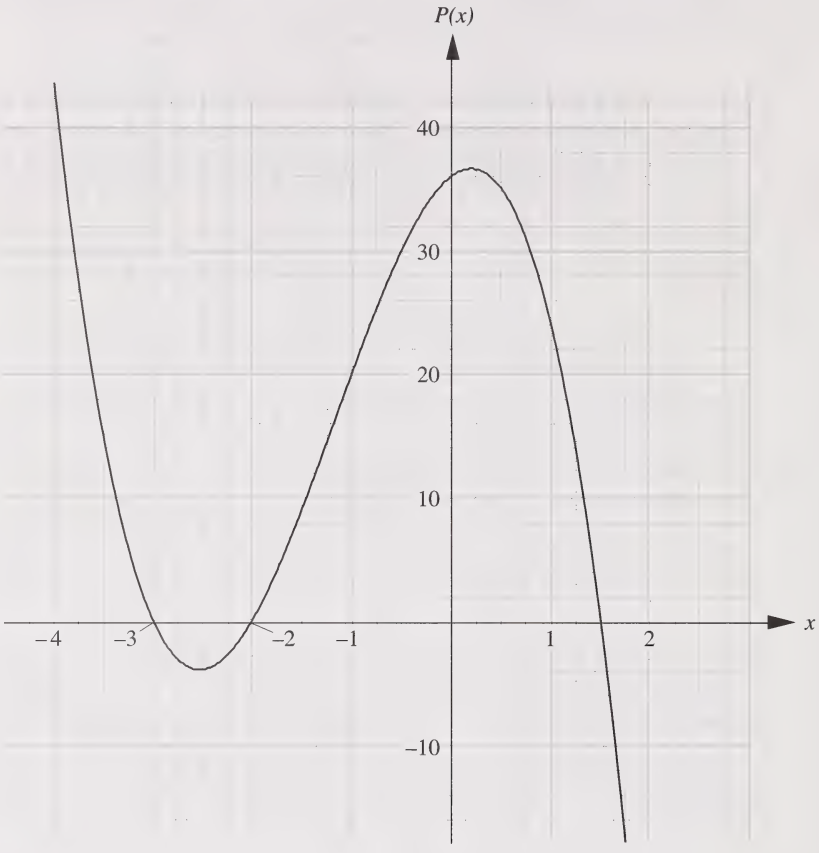
5 marks

4. The graph of a third-degree polynomial function is shown below.



Find the equation of the polynomial function that describes this graph. Use page 27 to clearly show all steps you take in order to determine your equation.

For Department Use Only

You have now completed the examination.
If you have time, you may wish to check your answers.

Mathematics 30 Formula Sheet

The following information may be useful in writing this examination.

I. Polynomial Functions

- $P(x) = D(x)Q(x) + R$
- The roots of a quadratic equation are $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

II. Trigonometry

- arc length $a = r\theta$
- $\sec A = \dfrac{1}{\cos A}$
- $\csc A = \dfrac{1}{\sin A}$
- $\cot A = \dfrac{\cos A}{\sin A}$
- $\sin^2 A + \cos^2 A = 1$
- $1 + \tan^2 A = \sec^2 A$
- $1 + \cot^2 A = \csc^2 A$
- $\sin(A + B) = \sin A \cos B + \cos A \sin B$
- $\sin(A - B) = \sin A \cos B - \cos A \sin B$
- $\cos(A + B) = \cos A \cos B - \sin A \sin B$
- $\cos(A - B) = \cos A \cos B + \sin A \sin B$

III. Statistics

- $z = \dfrac{x - \mu}{\sigma}$
- $y = mx + b$

IV. Quadratic Relations

- $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$
- $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
- eccentricity $e = \dfrac{|\overline{PF}|}{|\overline{PD}|}$, where F = focus,
  D = directrix, and
  P = point on the conic

V. Permutations and Combinations

- $n! = n(n-1)(n-2)\ldots(3)(2)(1)$
- ${}_nP_r = \dfrac{n!}{(n-r)!}$
- ${}_nC_r = \dfrac{n!}{r!(n-r)!}$
- $(x + y)^n = {}_nC_0x^n + {}_nC_1x^{n-1}y + {}_nC_2x^{n-2}y^2 + \ldots + {}_nC_kx^{n-k}y^k + \ldots + {}_nC_ny^n$

  General Term

  $t_{k+1} = {}_nC_kx^{n-k}y^k$

VI. Sequences and Series

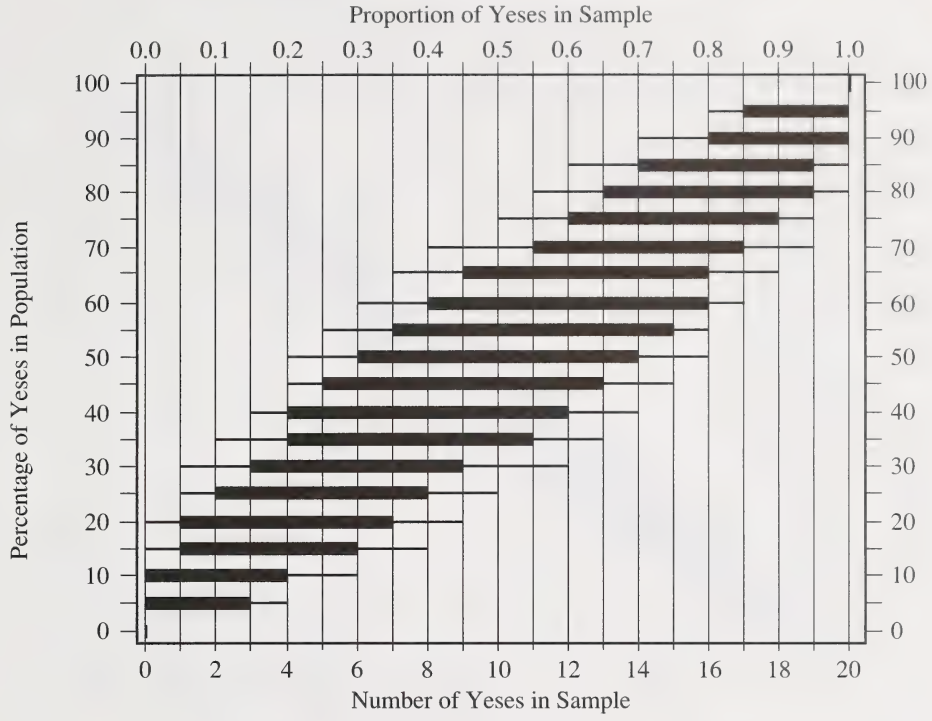
- $t_n = a + (n-1)d$
- $S_n = \dfrac{n(a + t_n)}{2}$
- $S_n = \dfrac{n[2a + (n-1)d]}{2}$
- $t_n = ar^{n-1}$
- $S_n = \dfrac{a(r^n - 1)}{r - 1}$, $r \neq 1$

Areas under the Standard Normal Curve

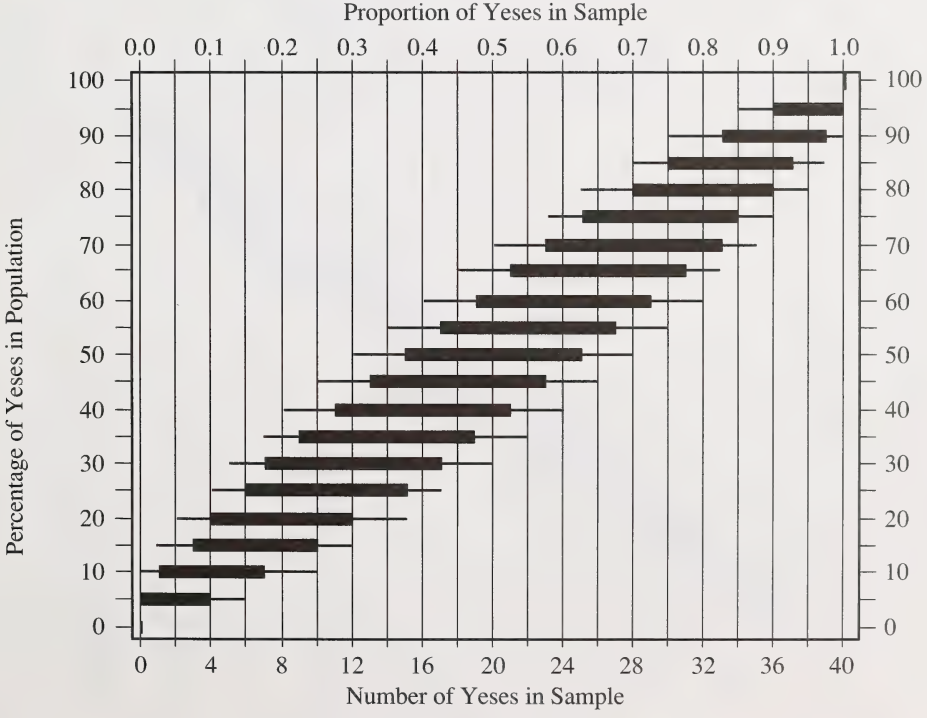
z	0	1	2	3	4	5	6	7	8	9
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0754
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2258	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2518	0.2549
0.7	0.2580	0.2612	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2996	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998
3.6	0.4998	0.4998	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.7	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.8	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.9	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000

Fold and tear along perforation.

90% Box Plots from Samples of Size 20



90% Box Plots from Samples of Size 40



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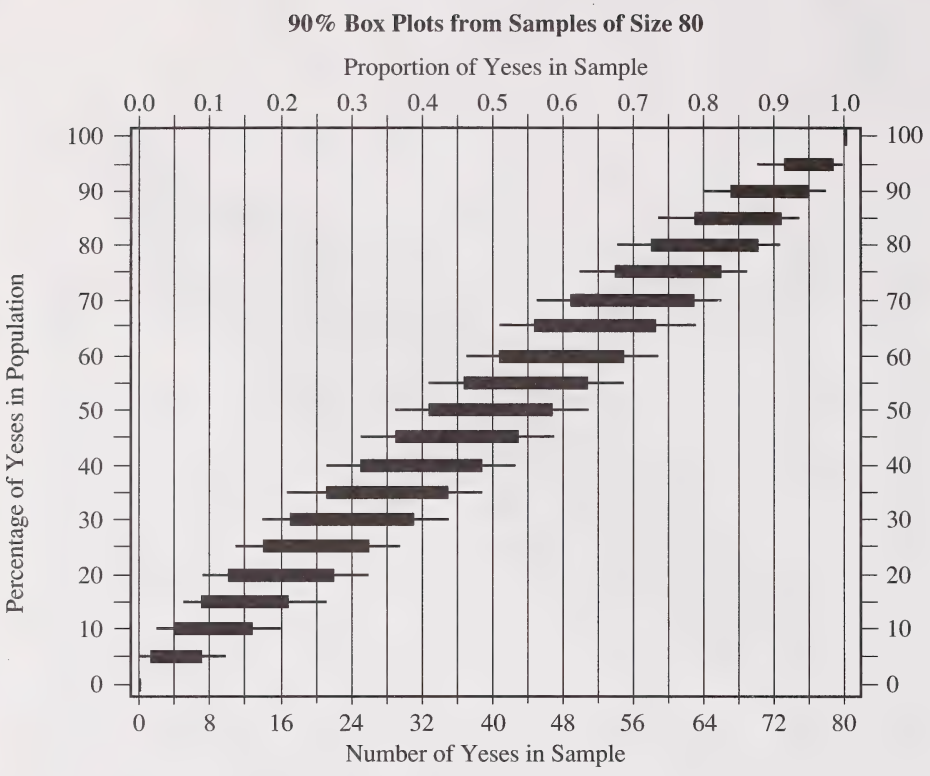

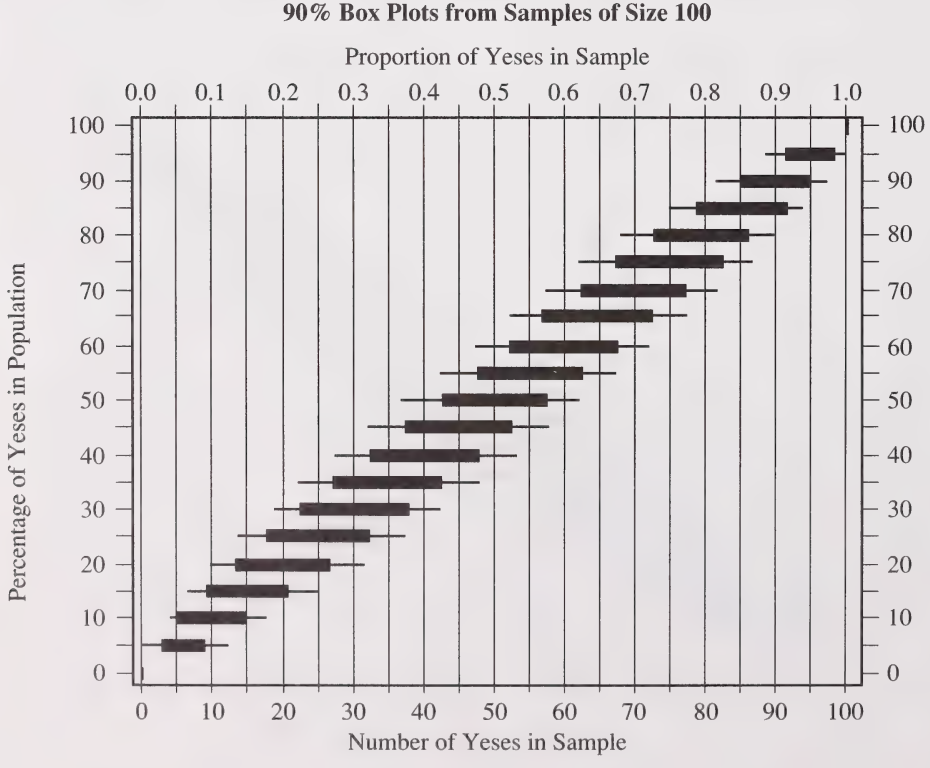

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Mathematics 30
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